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AUTHOR Bastick, Tony

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ABSTRACT

The research literature on student evaluation of teaching (SET) is filled with criticisms of the process, its applications, and the student feedback questionnaire it uses. SETs are still used, however, because there has seemed to be no economical, valid, and reliable alternative. This paper reports on an alternative alignment process for evaluating quality teaching and learning that fits the requirements of economy, validity, and reliability, and offers additional institutional, faculty, and student benefits. The method measures both the individual student's and the lecturer's expectations for change in three process objectives that underlie quality teaching and learning: skills, understanding, and attitudes. These three objectives and their assessment are operationally defined. Methods for using these three process objectives as vehicles for teaching, learning, and course development are supported by the institution through staff and course development programs and through recognition of their assessment in student grades and in faculty promotion and tenure decisions. The post-course criteria measuring quality teaching and learning are students' high academic attainments and course enjoyment. Teaching techniques for attaining these goals are left as a matter of informed professional choice to the lecturer. The separately measured in-course predictors of these criteria are the alignments of student/lecturer expectations of change in the three objectives. The theory behind this approach is that quality learning results when students and lecturer are working toward the same goals. This paper introduced the method and presents evidence validating the theory and showing that the indicators correlate with the criteria. (Author/SLD)

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Relationships Between In-Course Alignment Indicators and Post-Course Criteria of Quality Teaching and Learning in Higher Education

Tony Bastick,
University of the West Indies, Kingston, Jamaica
tbastick@uwimona.edu.jm

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Relationships Between In-Course Alignment Indicators and Post-Course Criteria of Quality Teaching and Learning in Higher Education

Tony Bastick,
University of the West Indies, Kingston, Jamaica
tbastick *a* uwimona.edu.jm

Abstract

The research literature on the Student Evaluation of Teaching (SET) is replete with criticisms of the process, its applications and the student feedback questionnaires that it uses. Despite these multifarious criticisms, SETs continue to be used because there has seemed to be no economic, valid and reliable alternative. This paper reports an alternative alignment process for evaluating quality teaching and learning that fits these requirements and offers 10 additional institutional, faculty and student benefits. The method measures both the individual student's and the Lecturer's expectation for change in three process objectives that underlie quality teaching and learning: Skills, Understanding and Attitudes. These three objectives and their assessment are operationally defined. Methods for using these three process objective as vehicles for teaching, learning and course development are supported by the institution through staff and course development programmes and by recognition of their assessment in student grades and in faculty promotion and tenure decisions.

The post-course criteria measuring quality teaching and learning are students' high academic attainments and course enjoyment. Teaching techniques for attaining these goals are left as a matter of informed professional choice to the lecturer. The separately measured in-course predictors of these criteria are the alignments of student/lecturer expectations of change in the three objectives; the theory being that quality teaching and learning results when students and lecturer are working towards the same goals.

This paper introduces the method and presents evidence validating the theory and showing that the indicators correlate with the criteria.

Introduction

This paper offers an alternative form of assessing quality teaching in tertiary institutions. The traditional method of assessing quality of teaching has been questionnaires that ask students to anonymously rate the quality of teaching on a 4 or 5 point Likert scale from strongly disagree to strongly agree. In the literature these forms are called Student Evaluations of Teaching (SETs).

SETs have been used in universities for more than thirty years as part of the Quality Assurance Cycle to assess the quality of teaching and as an indicator of successful teaching for promotion and tenure decisions. Unfortunately, their use has been accompanied by many counter- productive effects such as discouraging innovation, and deterring instructors from challenging students (Damron, 1995; Murray, 1984; Ruskai, 1996). Although their outcomes are intended to improve teaching, a major negative effect of also using

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them for promotion and tenure decisions has been to contribute to the lowering of academic standards. In the copious literature on the subject, this effect is referred to as 'grade inflation' or 'dumbing down courses' and some universities who use SETs now make statistical adjustments for these effects (Gillmore, & Greenwald, 1999). SETs have become known as little more than 'smile sheets' measuring popularity and 'customer satisfaction' (Altschuler, 1999), and lecturers have developed many methods for improving their SET scores that do not necessary improve teaching (Crumbley, 1995). Its seems that one reason SETs continue to be used is that there has not been an expedient alternative. This paper introduces such an alternative - an alignment method.

The Alignment method

There are many psychometric instruments that use what is referred to here as 'alignment methods'. In an alignment method a respondent's current state is assessed and his/her ideal state is also assessed on the same indicators. The difference between the current and ideal states is the alignment. Where the difference is large, there is poor alignment which is indicative of problems. Where the difference is small, alignment is good which indicates that the current state is close to the ideal. Improved alignment can also be used as a measure of successful intervention strategies. What is crucial to the alignment method is the choice of indicators measured to assess the current and ideal states. In tertiary education there are three process objectives that are emphasized in quality teaching and learning.

These are Skills, Understanding and Attitudes operationally defined here as:

1. Skills – learning of facts/processes. Assessed by speedy accurate reproduction.
2. Understanding – professional competence. Assessed by justification of novel application.
3. Attitudes – professional values. Assessed by demonstration.

The alignment method uses these as indicators. It should be noted that critical thinking is promoted by teaching and assessment of professional competence. This is because there are no right/wrong answers and only justifications are assessed. Alignment is not based on the course objectives. Course objectives and content are used as vehicles for emphasizing the desired degrees of Skills, Understanding and Attitudes. This emphasis will vary according to the course level and culture of the subject taught.

What are aligned are 'changes expected by the lecturer' and 'changes expected by the students' in each of these three indicators. Numerically stated: Alignment = changes expected by Lecturer - changes expected by students. Zero is the perfect score, the theory being that students achieve higher standards if they and their lecturer are working towards the same changes. The following Figure 1 shows the seven core questions that the lecturer and each student answers for the alignment to be calculated.

These forms are confidential, not anonymous. In fact, students have to pass a test when they enrol so as to earn the right to be considered as informed assessors. Individual's alignments can be grouped to assess the mean alignment of any student sub-group of interest - males v females, experienced v novice students, older v younger, option 1 v option 2 students, etc.

Two alignment scores are calculated:

- Alignment of Scope (changes in absolute quantity) and
- Alignment of Proportions (changes in relative quantity)

Figure 1: Five minute assessment form

	As it **is now** on this course	As it **should be** on this course	
(i) Emphasis on Skills *(getting it right)*	☐ Your estimate out of 100	☐ Your estimate out of 100	*Write a Number in each box*
	As **it is now** on this course	As **it should be** on this course	
(ii) Emphasis on Understanding *(knowing why)*	☐ Your estimate out of 100	☐ Your estimate out of 100	*Write a Number in each box*
	As **it is now** on this course	As **it should be** on this course	
(iii) Emphasis on Attitudes *(relevance to your life)*	☐ Your estimate out of 100	☐ Your estimate out of 100	*Write a Number in each box*
How much so far have **you enjoyed your experience of** the teaching on this course?	☐ Your estimate out of 100	*Write a Number in the box*	

However, these formative alignment indicators, that are measured during the course, are only predictors of quality teaching. They are not the criteria of quality teaching. The two accepted summative criteria of quality teaching are:

- Academic standards and
- Enjoyment of learning

Validation of the theory

When the courses are over and the academic results are compared with the alignment scores, it is possible to validate the theory for each course, and for each sub-group of students taking each course by correlating the Alignment of Scope with Academic standards and by correlating the Alignment of Proportions with Enjoyment of learning.

Further, when the course has finished it is possible to use sensitivity analyses on the data to calculate those lecturer's changes that would have most aligned the teaching and thus maximized the academic results and enjoyment of the students. It is seen from actual alignment data that having chosen these preferred changes would have increased the correlations between alignment and academic standards, thus further validating the theory that alignments are predictors of quality teaching. This is illustrated by data in Figure 2.

Illustrative Results

Figure 2 illustrates a typical data input, analysis and results sheet for the alignment assessment of a course.

Figure 2: Example input, analysis and results for the alignment method

Part 1 For the Lecturer			Course	ED40C	Date	15/11/00	Name						
	Skills		Understanding		Attitudes		Enjoyment	Variables of Interest					For Validation Academic Results
	is now	should be	is now	should be	is now	should be							
Start	30	60	40	45	60	50	50						
Best	**30**	**30**	**40**	**44**	**60**	**71**							
3AF COURSE ASSESSMENT - DATA SHEET OPTIMISATION OF TEACHING													
Part 2 For the Students			# in class	36	# present	20							
	Skills		Understanding		Attitudes		Enjoyment	Sex	Age	Program	Option	Years Teaching	
#	is now	should be	is now	should be	is now	should be							
12	50	50	95	98	90	95	95	2	30	3	2	6	56%
25	35	70	60	80	80	88	55	2	25	3	2	3	57%
35	80	40	20	60	40	50	30	2	25	3	2	3	43%
30	40	80	70	90	70	90	75	2	21	3	3	0	71%

Part 3 Summary Results	Lecturer's changes						Alignment Predictors		Mean post-course results		**Validation** Correlations	
	Scope			Proportion								
	Skills	Underst	Attitudes	Skills	Underst	Attitudes	MScope	MProp	Enjoy	Acad	Scope	Prop
	Whole	Class			n=20							
Start	100%	13%	-17%	16%	-2%	-14%	1 499	0 380	69 5%	63 0%	-0 265	-0 225
Best	**0%**	**10%**	**19%**	-3%	0%	3%	**0.674**	0 154			-0 307	-0 594
	Option	2	History		n=3							
Start	100%	13%	-17%	16%	-2%	-14%	1 861	0 458	60 0%	52 2%		
Best	**0%**	**33%**	**10%**	-4%	5%	-1%	**1.221**	0 299				
	Option	4	Modern Languages		n=4							
Start	100%	13%	-17%	16%	-2%	-14%	1 200	0 293	72 5%	75 7%		
Best	**13%**	**3%**	**10%**	1%	-2%	0%	**0.223**	0 065				

Figure 2 is in three parts Part 1 'For the Lecturer', Part 2 'For the students' and Part 3 'Summary Results'. In Part 1, the 'Start' row shows the seven numbers input from the Lecturer's alignment form that was displayed in Figure 1. Part 2 'For the Students' shows just a selection of four rows #12, #25, #35 and #30, from the alignment forms of all the students in the course. As well as the seven numbers from the students' alignment forms, these rows have been extended to show variables of interest to the lecturer. The last column for the students shows their academic results. These are entered after the course and are used to validate the predictions from the in-course alignment indicators and to further validate the alignment theory. The 'Summary Results' section, Part 3, shows the calculated changes resulting from the lecturer's start position. It is seen, for example, that the lecturer's starting position for Skills of 30 for 'is now' and 60 for 'should be' requires a 100% change, i.e. (60 - 30)/30= 100%

Although not shown, the student changes were calculated in the same way and each compared with the lecturer's changes. This was done for changes in both Scope and Proportion. Scope is calculated for each student as the total of the student/lecturer absolute differences in the raw numbers given for the three objectives. Proportion alignment for each student is calculated in a similar way but using proportional changes calculated from the six numbers. The Alignment indicators shown in the results section of Figure

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2 are the average of students' scope alignments. From this start position the average scope Alignment for all students was 1.499. Students' scope alignments were correlated with their academic results at -0.265 Also their Proportions alignment was correlated with their reported enjoyment at -0.22. This means that the more aligned students and their lecturer were on Scope then the higher were the students' academic results. Also, the more aligned students and lecturer were on Proportion then the more the students enjoyed the course. These results agree with the theory.

We can do a similar analysis for any subgroup of interest. Figure 2 also shows this analysis for two separate option groups in Part 3 - for Option 2 'History' students and for Option 4 'Modern language' students. The Scope alignment and proportion alignment for these two sub-groups is given along with their respective mean enjoyment scores and mean academic results. It will be noticed that the Modern Language students were more aligned in both Scope and Proportion than were the History students. Correspondingly, we find that the mean academic results and enjoyment of the Modern Language students were higher than those of the History students. Although the sizes of the sub-groups were small, these comparative sub-group results are also in agreement with the alignment theory.

Calculating changes that optimise teaching and learning

We can use a simple linear programming algorithm to find those lecturer changes that would result in the best/minimum alignment. There are many options for this calculation that depend on the indicator of most interest and the lecturer's freedom of choice. The first example in Figure 2 minimises the mean scope alignment for all students of 1.499 and calculates the 'Best' changes that would give this minimised scope alignment. The resulting 'Best' changes are shown in Part 3 of Figure 2 as 0% for Skills, 10% for Understanding and 19% for Attitudes. Given the lecturer's initial evaluation of the whole class as 30, 40 and 60, these optimum changes imply that the lecturer should have been working towards 30 (no change), 44 and 71. If the lecturer had done so then the students' alignment scores would have changed and their correlations of academic attainment with the new scope alignments and proportion alignments would have improved to -0.307 and -0.59 respectively. This sensitivity analysis again demonstrates (i) the predictive validity of the alignment indicators, in that scope alignment and proportion alignment correlate with attainment and enjoyment, and (ii) the validity of the theory that the better the scope alignment then the higher is the academic attainment and the better the proportion alignment then the more the students enjoy the course.

A similar sensitivity analysis was done for the History and Modern Language option groups by minimising their alignments to find the best changes for these two sub-groups. Figure 2 shows that the best alignments for these two groups are 1.221 and 0.223 respectively. The mean proportion alignments for these two option groups would then also have improved to 0.99 and 0.065 respectively.

Traditional SETs are a 'post mortem' assessment, collected at the end of the course when it is too late to feedback to help the students who made the assessments. However, a lecturer does not have to wait until the course is over to optimise teaching using the alignment method. The data collected in-course can be processed by the same type of sensitivity analysis to calculate the optimum changes that should be made by the lecturer to maximize the students post-course academic attainment and/or course enjoyment.

Administrative Decision point assessment of quality teaching

The lecturer may utilize the five-minute alignment form many times during the course to keep teaching on track. The administration uses it just once near the end of the course to calculate the final alignment score for that lecturer's quality of teaching. This results in a single decision point number that can be compared across the institution and used for promotion and tenure decisions.

It will be noticed from Figure 2 that the minimum alignment that is possible for this group is 0.674. The minimum possible alignment for the History students was much higher at 1.221 than for the Modern Language students at 0.223. These minimum possible alignment scores illustrate the best teaching/learning that is possible with these sub-groups of students and reflects the fact that students are not all equally amenable to required educational changes in Skills, Understanding and Attitudes. To give the lecturer some protection from such intransigence the measure of quality teaching is taken as the actual alignment less this minimum possible alignment. In the example given the measure of quality teaching for the whole class is 1.499 and the best possible alignment for the whole class is 0.674. Hence, the quality teaching score for the whole class is 1.499-0.674=0.825. This is shown in Table 1.

Table 1: Quality Teaching (QT) scores for whole class and sub-groups

	Alignment scores		
Sub-Group	Mean Scope	Best Scope	QT score
Class	1 499	0 674	0 825
Option 2	1 861	1 221	0 640
Option 4	1 200	0 223	0 977

It can also be noticed from Table 1 that, as often happens in class teaching, the quality of teaching was skewed more towards the needs of the more intransigent group.

Discussion

This paper has only touched on the classroom assessment use of the Alignment Method. It has not discussed the staff and course development aspects of the method or the many benefits the method offers for Quality Assurance compared to traditional SETs.

This alignment method of assessing teaching quality offers 10 main benefits:

1 It identifies the quality of teaching experienced by each individual student.
2 It can be used to identify groups of students that might be disadvantaged by the teaching.
3 It offers detailed diagnostic reports to help the lecturer.
4 It only takes 5 minutes to administer and the analysis is quick and low-cost.
5 It can be given several times in-course resulting in optimum recommendations to keep teaching on track.
6 It is sensitive to criteria considered important in different subject areas and by different Faculties and levels of students.
7 It maintains lecturer/student trust and promotes higher quality teaching and higher quality learning.
8 It protects academic freedom, is non-threatening and has built in protection for Faculty who teach intransigent students and difficult courses.
9 It uses one standard form and gives one single decision-point number that can be used in institutional evaluations for comparing quality of teaching across the university e.g. for Quality Audits, teaching awards and for promotion and tenure decisions.
10 Post-course correlations with academic standards evidence the reliability and validity of the instrument for each course and for subgroups of students taking each course on which it is used.

This alignment method can be flexibly piloted at different levels within an institution - at the level of full institutional evaluation, at the level of staff and course development within Faculties, Schools or Departments and at the level of individual lecturers who are interested in improving the quality of their own teaching for their own students. Web-based Alignment software is now being developed that will enable lecturers and administrators from tertiary institutions worldwide to avail themselves of the benefits of using the alignment method in their own institutions.

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